IEEE P802.11
Wireless LANs

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| IEEE 802.11 Study Group on Light Communications May, 2018 Warsaw Meeting Minutes |
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Abstract

Study Group on Light Communications meeting minutes from the IEEE 802.11 Warsaw meeting, May 2018.

**IEEE 802.11 Study Group on Light Communications**

**Monday, May7, 2018, PM2 Session**

Attendance: around 35 people

1. The IEEE 802.11 LC SG meeting was called to order at by the Chair, Nikola Serafimovski (pureLiFi).
2. The Chair Nikola Serafimovski (pureLiFi) reviewed the IEEE-SA patent policy, logistics, and reminders, including meeting guidelines and attendance recording procedures.
	* It is reminded all to record their attendance.
3. The Chair Nikola Serafimovski (pureLiFi) introduced the schedule for the week
	* See doc. 11-18/0631r1
		+ Approve minutes from Mar. 2018
		+ Discuss possible milestones (documents) for LC TG consideration
		+ Discuss suitability of work done in the TIG/SG for the TG
		+ Discuss possible timeline for LC TG consideration
4. Approve the minutes from the March meeting in doc. 11-18/0560r3.
	* Chair asked if there are discussions. No discussion. The minutes were approved.
5. Nikola Serafimovski (pureLiFi) recused himself and handed the Chair to John Li (Huawei) who is the Vice-Chair of the group.
6. Nikola Serafimovski (pureLiFi) introduced doc. 11-18/0908r0 on the proposed timeline with John Li (Huawei) as acting Chair. The document proposed a possible timeline for work in 802.11 LC TG which basically starts with the call for proposals in July 2018 and these contributions would be due by January 2018.
7. There was a discussion on the document
	* Comments were made that the group should be active to attract big lighting vendors to contribute. It has been reported that one lighting vendor is unhappy with the aggressive approach followed in 802.11 LC group and may ignore the work in the group.
	* It was highlighted that there is overlap with the work in 802.15.13 which is trying to finish its specifications by the end of the year. It may be difficult for some members in 802.15.13 to prepare their contributions in time.
	* Nikola (pureLiFi) answered the first point that it is up to the companies to contribute or not and whether they will implement a standard or not. However, the group has been given a schedule outlined in the PAR for TGbb and should try to complete it’s work in that time.
	* Nikola (pureLiFi) answered the second point that by finishing the 802.15.13 those contributors may be well prepared for submitting proposals into 802.11 LC. However, the resource limitation of any one entity and any one contributor cannot become the bottleneck for the TG.
8. Nikola (pureLiFi) asked for a straw poll regarding the acceptance of the proposed timeline in doc. 18/908r0. The straw poll results in Y/N/A were 16/2/9. The straw poll passed.
9. The Vice-Chair John Li (Huawei) handed the meeting back to Nikola Serafimovski (pureLiFi) as Chair.
10. Q: The TG should have further documents not listed in doc. 11-18/0908r0 like the requirements document, evaluation framework and some others. The documents were added to the list without changing the deadline and the new document was uploaded as doc. 11-18/0908r1.
11. Oliver Luo (Huawei) presented doc. 18/0909r0 on the usage models for LC.
	* Industrial wireless communications
	* Medical environments
	* Enterprise network
	* Secure home network
	* Backhaul network

There were some discussions about whether the underwater scenario should be included or not. Tuncer Baykas (Medipol Univ.) suggested to make a contribution related to this usage model.

Meeting was recessed until Tuesday PM2.

**Tuesday, May 8, 2018, PM2 Session**

Attendance: around 20 people

1. The IEEE 802.11 LC SG meeting was called to order at by the Chair, Nikola Serafimovski (pureLiFi).
2. The Chair Nikola Serafimovski (pureLiFi) reviewed the IEEE-SA patent policy, logistics, and reminders, including meeting guidelines and attendance recording procedures.
	* It is reminded all to record their attendance.
3. The Chair Nikola Serafimovski (pureLiFi) introduced the schedule for the session. Essentially there are 4 presentations.
4. Ryan Mennecke (John Hopkins University Applied Physics Labs, JHUAPL) presented doc. 11-18-0856/r1 entitled ”Commercial Solutions for Classified (CSfC) for Li-Fi”. It explain the process of getting new technologies approved for the use of US government authorities. There are 2 Li-Fi capability packages (Mobile Access and Campus WLAN). It is important to have classified products based on existing standards. LiFi point to point could utilize the IEEE or IETF RFC once the LC amendment is complete.

Q: PHY and MAC layer are specified also concerning security. What happens in the backhaul concerning security.

A: LiFi basically replaces RF and will have similar security mechanisms but there’s no expert here in backhaul security

Q: References and document number should be updated.

A: Will be updated in 11-18-0856/r2.

1. Stephen McCann (BlackBerry) presented doc. “Internal Automotive Use Cases” in doc. 11-18-0940r0. Connect various electronic control units within a car, LC could be one interesting technology for this. Time-synchronous networks could also be useful for that. Task is to replace cabling in the car, e.g. remove wiring in trucks and trailers. Avoid RF interference, provide low latency, high speed LC could enable synchronous data transmission and time-sensitive networking together. Reversing camera is one of the use cases. It has tight timing constraints. Distances are between millimeters up to 10 meters, data rates between 200 Mb/s to 1 Gb/s.

Q: Usage models, do they cover this.

A: Existing models go into the right direction.

1. Volker Jungnickel (Fraunhofer HHI) presented 11-18-0829r1 on Light Communication in the Industrial Wireless Scenario. It described results from a LC field trial conducted in BMW robotics lab in a real working environment showing the value of MIMO for ultra-reliable low latency communications (URLLC) even in scenarios where the line-of-sight is frequently interrupted due to the mobility of the robot during the work cycle. The contribution pointed out that 802.11bb could provide an optimized support for distributed MIMO for LC, both in the physical and MAC layer in order to address the industrial wireless usage model in the best way.

Q: Does the transceiver shown actual transmit because it didn’t seem to be visible. Also, what bandwidth was used?

A: The transceiver transmitted in IR so there is no human visible spectra so as not to blind humans that are in the environment. The bandwidth used is 100 Mbps.

Q: Question about the MIMO on slide 9. The question was about aligning and timing in relation to MIMO.

A: It was all done in the analog domain.

1. Tuncer Baykas presented doc. 11-18/0931r0 on Outdoor Usage Models. First model is Underwater Communication, Video transmission, sensor networks. Uplink and downlink use LC. Second model is V2V Communication at distances between 1-50 m, 1 Mb/s speed. There are problems with sunlight. LC can provide interference free support for 802.11p. Third model is I2V and V2I Communications. Street lights, traffic lights or any signage can be used for IoT. 4th usage model is Pipeline Communication in extreme environment. Ban of RF combined with low throughput of acoustic communication of pipelines Gases in the environment is dissimilar of the atmosphere. Distances between 100 and 400 m, multi-hop communication is being used.

Q: Are the limitations on the wavelength?

A:This depends very much on the content and the diameter of the pipeline.

Q: V2V communication: There might be no time for association. Why in the uplink no association?

A: In the V2I case association is possible.

Q: 880-910 absorption will start in the gas pipeline.

A: In Reference [3] there are spectral characteristics considered.

**Wednesday, May 9, 2018, AM1 Session**

Attendance: around 17 people

1. The IEEE 802.11 LC SG meeting was called to order at by the Chair, Nikola Serafimovski (pureLiFi).
2. The Chair Nikola Serafimovski (pureLiFi) reviewed the IEEE-SA patent policy, logistics, and reminders, including meeting guidelines and attendance recording procedures.
	* It is reminded all to record their attendance.
3. The Chair Nikola Serafimovski (pureLiFi) introduced the schedule for the session. Essentially there is one presentation.
4. Jiamin Chen (Huawei) presented doc. 11-18-0948/r0 on “Potential TGbb task group documents” to be delivered. Starting from usage model, we need a channel model, evaluation methodology and functional requirements. This all goes into the specification framework which will be the basis for the amendment draft creation. Slides compare the process with the one in TGay. Concerning channel models it is proposed to reuse the channel modelling document from 802.15. Functional requirements can be similar to TGay. Similar for the evaluation methodology. Volunteers will be requested for preparing these documents in July meeting.

Q: What about the ultrashort range scenario?

A: This is from TGay.

Q: Has every usage model to be represented by a channel model?

A: Normally not every usage model is represented in the channel model. This depends on the activity in the group and on volunteers doing that work.

Q: Is there a general requirement to have channel models verified by measurements?

A: The Chair replied he is not aware of any general policy. This is up to the task group to decide what is required at the end.

C: There is the European Marie Curie project VISION which starts working during these days where work on channel and transceiver modeling is planned. 802.11bb could expect contributions from this project.

1. The Chair Nikola Serafimovski (pureLiFi) asked if there is any more item to be discussed. There was nothing mentioned by the group.

The meeting adjourned at 8:30 until July.